भारतीय मानक
Indian Standard

IS 12234 : 2021

ठंडे पानी के लिए प्लास्टिक के साम्य फ्लोट वाल्व — विशिष्टि

(पहला पुनरीक्षण)

Plastic Equilibrium Float Valves for Cold Water Services — Specification

(First Revision)

ICS 23.060.01; 91.140.70

भारतीय मानक ब्यूरो
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December 2021 **Price Group 7**

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Sanitary Appliances and Water Fittings Sectional Committee had been approved by the Civil Engineering Divisional Council.

Noting the current trend in international market and to make better use of material resources, and ensuring more efficient and trouble free functioning of the valve parts, this standard was formulated in 1988 to cover plastic float equilibrium valves.

The principle of functioning of the equilibrium float valve is quite different from the brass copper alloy valves covered by IS 1703 : 1977 'Water fittings — Copper alloy float valves (horizontal plunger type) — Specification (*fourth revision*)'. Diaphragm type plastic float valves are covered in IS 13049 : 1991 'Diaphragm type (plastic body) float operated valves for cold water services — Specification'.

In this revision of the standard, the following major modifications have been incorporated:

a) Provisions on pressure reducing attachments have been modified.

b) Materials for inlet float valves have been updated considering the current manufacturing practices.

c) Provisions have been updated to cover inlet valves for concealed cisterns.

d) Prevalent float design has been incorporated considering that spherical floats which were more suitable for single flush cisterns do not find much application in the current scenario.

e) Vertical inlet shank float valve of adjustable height have been introduced.

The composition of the Committee responsible for the formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding of numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PLASTIC EQUILIBRIUM FLOAT VALVES FOR COLD WATER SERVICES — SPECIFICATION

(First Revision)

1 SCOPE

1.1 This standard covers requirements for equilibrium float valves of plastic, for water service up to 45 °C for use in applications, such as for coolers, flush tanks and overhead tanks.

1.2 Diaphragm type (plastic body) float operated valves are covered in IS 13049.

2 REFERENCES

The Indian Standard given below contain provisions, which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards given below:

IS No.	*Title*
2643 : 2005	Pipe threads where pressure — Tight joints are not made on the threads — Dimensions, tolerances and designation (*third revision*)
4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
7231 : 2021	Plastic flushing cisterns for water closets and urinals — Specification (*third revision*)
13049 : 1991	Diaphragm type (plastic body) float operated valves for cold water services — Specification

3 CLASSIFICATION

3.1 Float valves shall be of the following two types:

a) Horizontal inlet shank type, and

b) Vertical inlet shank type.

3.2 Each float valve shall be supplied with a pressure reducing attachment (*see* Fig. 1). The pressure reducing attachment shall be fitted and used as per manufacturer's instructions, where inlet water pressure is more than 1.05 MPa.

4 NOMINAL SIZE

The nominal size of the float valve shall be 15 mm.

5 MATERIALS

5.1 The component parts shall be made of materials as given in Table 1. The requirements for the materials of any component shall be as agreed to between the manufacturer and the purchaser.

Table 1 Materials for Body and Components Parts of Float Valves

(*Clause* 5.1)

Sl No.	Component	Material
(1)	(2)	(3)
i)	Valve body, back nut, cap, float arm	Polyacetal
ii)	Inlet shank	Polyacetal/Brass/Stainless steel
iii)	Float and flow restrictors	Polypropylene
iv)	Discharge tube	Polypropylene or low density polyethylene (LDPE) or high density polyethylene (HDPE) or ethylene vinyl acetate (EVA)
v)	Diaphragm	Nitrile rubber/silicon rubber
vi)	Diaphragm pin	Stainless steel or polyacetal or any other non-corrosive material

5.2 With the exception of inlet shank where no reworked material shall be used, the use of manufacturer's own rework material up to 15 percent shall be permitted.

6 MANUFACTURE AND WORKMANSHIP

6.1 Parts shall be sound in all respects and shall be free from flash, plugging which may arise during manufacture.

6.2 The materials used for manufacturing the parts in contact with water shall not constitute a toxic hazard and shall not foster microbiological growth nor give rise to odour, cloudiness or discolouration of the water.

7 CONSTRUCTION

7.1 Illustrations of typical equilibrium float valves, both horizontal inlet shank and vertical inlet shank, are shown in Fig. 2A and Fig. 2B, respectively. The shape of the component parts as shown in the figures is only illustrative, but dimensions or minimum requirements where specified shall be binding.

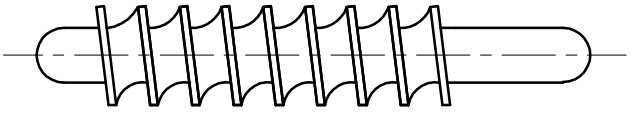
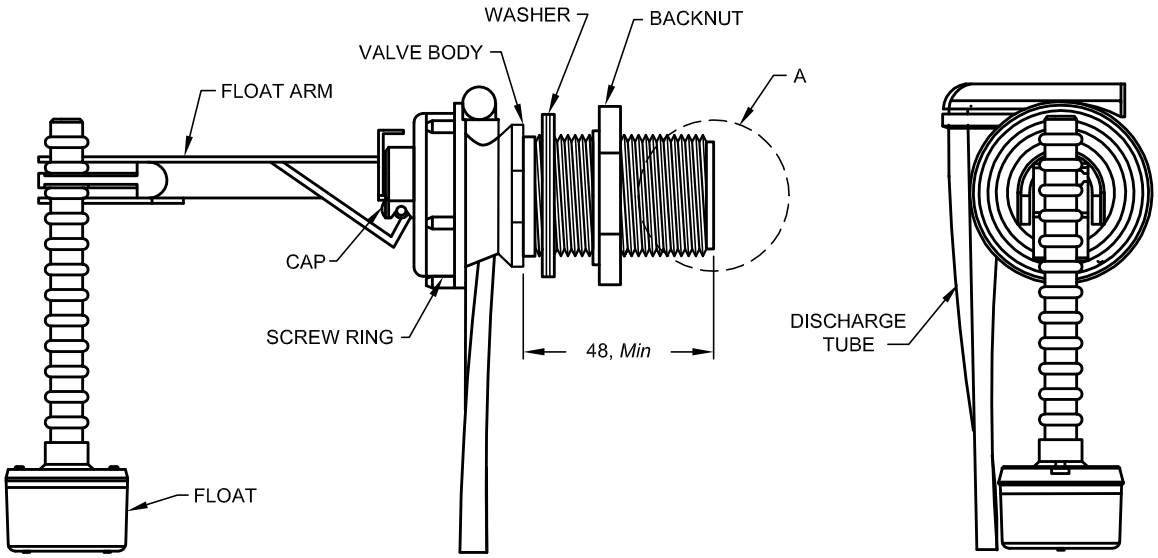
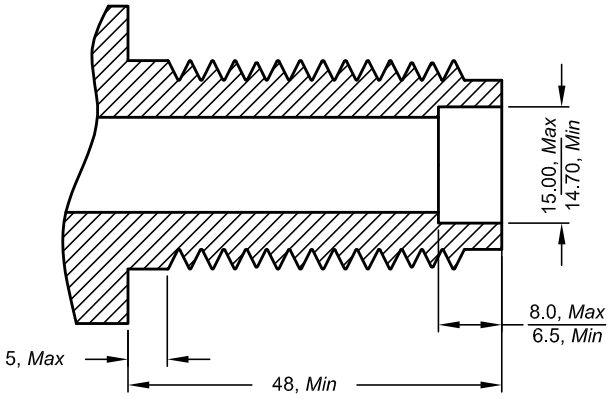


FIG. 1 TYPICAL FLOW RESTRICTOR (PRESSURE REDUCER)

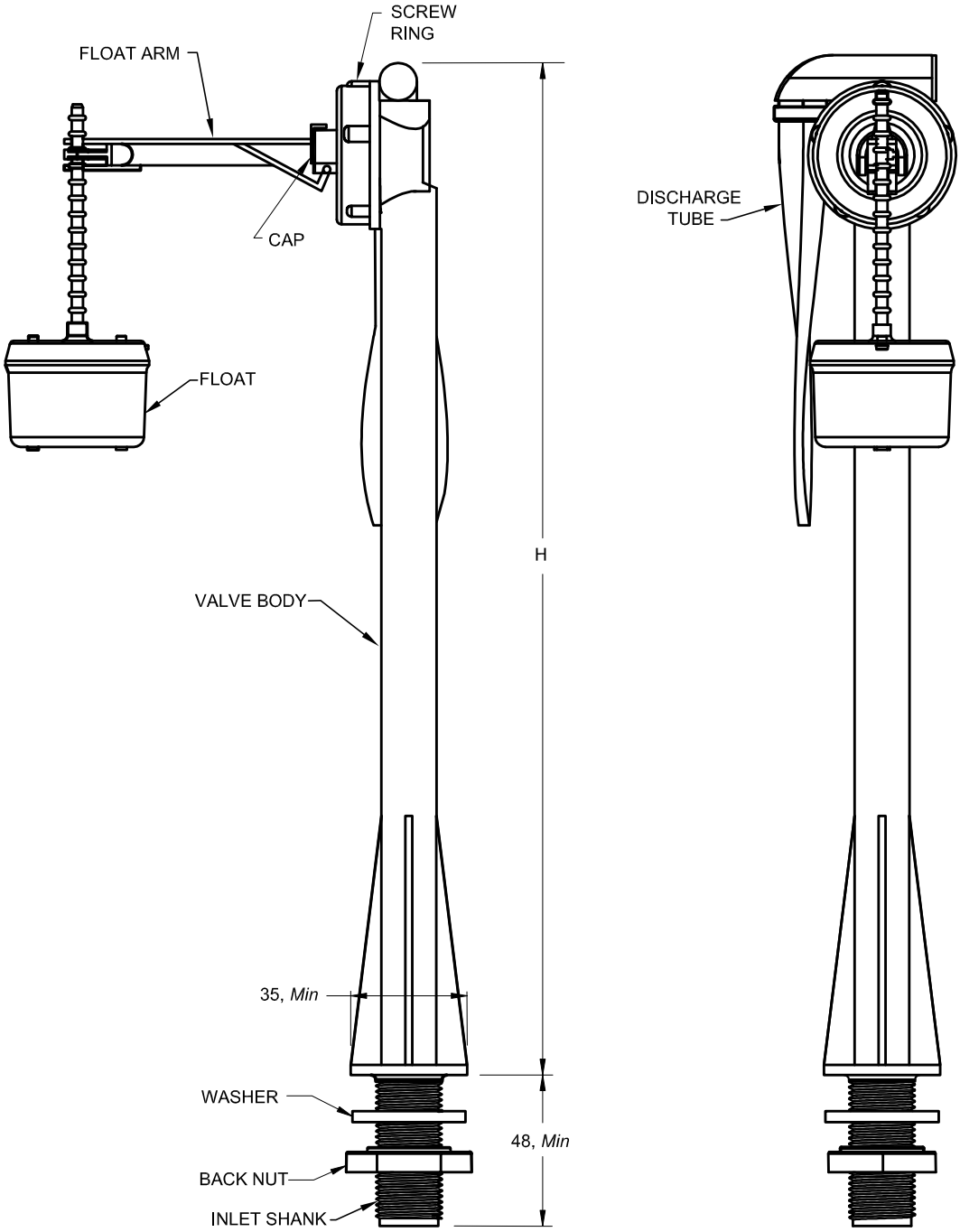




ENLARGED DETAIL A

All dimensions in millimetres.

2A HORIZONTAL INLET SHANK TYPE FLOAT VALVE



All dimensions in millimetres.

2B Vertical Inlet Shank Type Float Valve

Fig. 2 Typical Inlet Float Valves

7.1.1 Horizontal inlet shank type float valve can be installed in both ceramic cistern and plastic cistern including plastic concealed cistern. The inlet float valve for concealed cistern shall be designed in a manner to suit customer's specific requirements. A typical horizontal inlet shank type float valve for concealed cistern is shown in Fig. 3.

7.1.2 The height, *H* of the vertical inlet shank type float valve shall be as per the requirement of the cistern manufacturer. Such float valves with adjustable height mechanism can also be supplied so that its height can be adjusted according to the height of the cistern. The minimum bore shall be 9 mm. These can be installed in plastic cisterns or ceramic cisterns including close coupled cisterns and one piece water closet cistern, where there is provision of fitment of vertical inlet shank type float valve through bottom.

7.2 The body, inlet shank and seat should be made of one single unit to constitute the body of the valve. The inlet shank may be vertical or horizontal. Where the valve body and shank are separate components, suitable means shall be provided to lock valve body and shank in cistern.

7.3 The seating of the float valve shall be made integral with the body and shall be rounded so that there are no sharp corners.

7.4 The dimensions of the body shall conform to sizes shown in Fig. 2A and 2B for respective types, namely, horizontal inlet shank and vertical inlet shank.

7.5 Screw Threads

The inlet shank shall have external parallel fastening thread conforming to IS 2643 of same size as the nominal size of the float valve.

7.6 The diaphragm shall be made of synthetic rubber moulded to have the form and dimension as required for the operation of the valve. The central portion may be reinforced with a moulded polyacetal insert.

7.7 The float arm shall be so made as to securely fit into the body cap. The other end of the arm shall be provided with a built-in attachment to attach the float. The design of the arm or float shall incorporate a readily accessible method of adjusting water level without bending the arm.

7.8 The valve shall be provided with a discharge with antisiphonage provision.

7.8.1 The discharge shall be provided with a suitable discharge tube adopted to receive an open-ended plastic tube.

7.8.2 Every float valve shall be so constructed as to effectively prevent back siphonage of water previously discharged by the valve at all water levels up to the horizontal centre line of the valve.

7.9 Floats

The float shall be watertight and non-absorbing and shall not contaminate water.

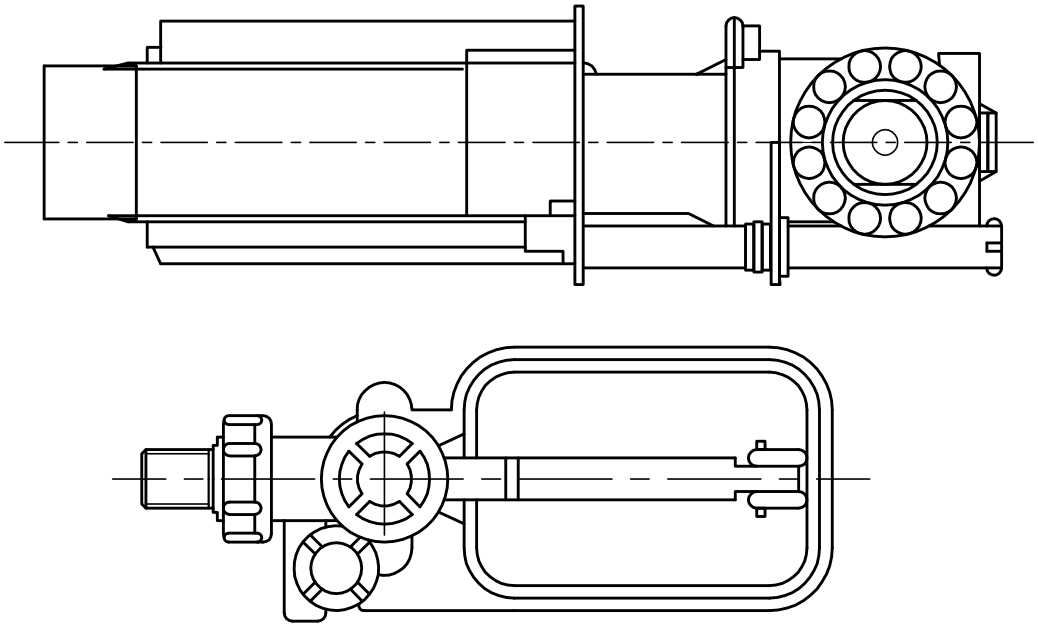


FIG. 3 TYPICAL HORIZONTAL INLET SHANK TYPE FLOAT VALVE FOR CONCEALED CISTERNS

7.10 Back Nut

The back nut shall be provided with parallel internal threads conforming to IS 2643 and of the same size as the float valve.

8 PERFORMANCE TESTS

8.1 Hydraulic and Shut-Off Test

8.1.1 The float valve shall be capable of withstanding 2.0 MPa water pressure for 60 s without leak or sweating while held in the closed position.

8.1.2 The diaphragm valve when assembled in working condition but without flow restrictors and with the float immersed to half its volume shall remain closed against a test pressure of 1.05 MPa.

8.2 Antisiphonage Test

8.2.1 The float valve when tested according to Annex A shall have no back siphonage as indicated by the presence of water in the catchpot. This shall be a type test.

8.3 Flow Test

8.3.1 The float valve shall be capable of delivering at least 9 litres of water in 3 min into its container when tested according to Annex B.

8.4 Endurance Test

8.4.1 The endurance test shall be carried out according to Annex C. The float valve shall be capable of completing 200 000 cycles and shall then be capable of satisfying hydraulic and shutoff test (*see* **8.1**). This shall be a type test.

9 SAMPLING

9.1 Scale of Sampling

9.1.1 *Lot*

In any consignment, all the float valves of same type and design, made of the same material and produced under similar conditions shall be grouped together to constitute a lot.

9.1.2 For ascertaining the conformity of the material to the requirements of the standard, samples shall be tested from each lot separately.

9.1.3 Number of valves to be selected from a lot shall depend upon the size of the lot and shall be in accordance with col 1 and col 2 of Table 2.

Table 2 Scale of Sampling and Criteria for Conformity

(*Clause* 9.1.3)

Sl No.	Lot Size	Sample Size	Acceptance Number
(1)	(2)	(3)	(4)
i)	Up to 100	5	0
ii)	101-150	8	0
iii)	151-500	13	1
iv)	501-1 000	20	1
v)	1 001 and above	32	2

9.1.3.1 The valves from the lot shall be selected at random and in order to ensure the randomness of selection procedures given in IS 4905 may be followed.

9.2 Number of Tests and Criteria for Conformity

9.2.1 All the valves selected according to col 2 and col 3 of Table 2 shall be examined for material, manufacture and workmanship, and construction. Any valve failing in one or more of these requirements shall be considered as defective.

9.2.2 The lot shall be considered as conforming to these requirements if the number of defective items found in the sample is less than or equal to the corresponding acceptance number given in col 3 of Table 2.

9.2.3 The lot having satisfied the requirements given in **9.2.1** shall be further tested for hydraulic and shut-off test (**8.1**) and flow test (**8.3**).

9.2.3.1 For this purpose, the number of valves given in col 3 of Table 2 shall be further examined if they are found to be satisfactory in other requirements given in **9.2.1**.

9.2.4 The lot shall be considered to have satisfied the requirements for hydraulic and shut off test and float test if none of the sample fails in these requirements.

9.3 For antisiphonage (*see* **8.2.1**) and endurance (*see* **8.4.1**), the tests shall be performed whenever there are changes in the design, materials, manufacture and construction. From the first lot after such a change takes place, 1 float valve at random shall be taken from those already found satisfactory in **9.2.2** and **9.2.4** in respect of all other requirements of this standard. If this sample float valve passes the antisiphonage test and endurance test, the lot to which the sample belongs and all the subsequent lots manufactured under the same conditions of design, material, manufacture and construction shall be deemed to conform to the antisiphonage test and

endurance test till any change takes place. Even if no change is envisaged, antisiphonage test shall be done once in a month and endurance test shall be done once in 6 months.

10 MARKING

10.1 Each float valve shall be legibly marked with the following information:

a) Manufacturer's name or trade mark,
b) Size of the valve,
c) Type of the valve, and
d) Batch/lot number and date of manufacturing.

10.2 BIS Certification Marking

Each valve conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act,* 2016 and the Rules and Regulations framed thereunder, and the valve may be marked with the Standard Mark.

ANNEX A

(*Clause* 8.2.1)

ANTISIPHONAGE TEST

A-1 PROCEDURE

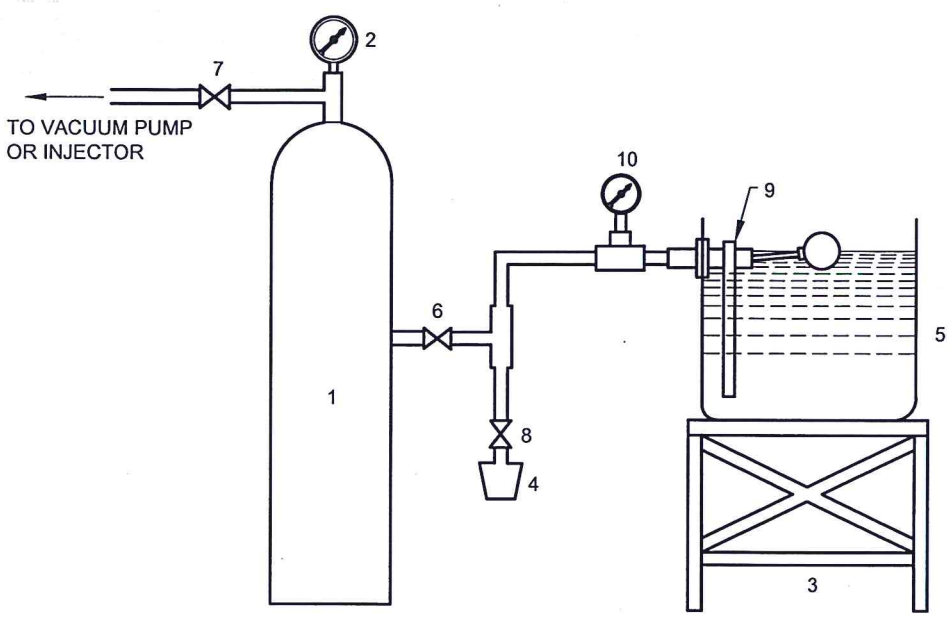
A-1.1 Assemble the apparatus as shown in Fig. 4.

A-1.2 Water is run into cistern (5) until water level is at the horizontal centre line of the float valve.

A-1.3 Close valves (6) and (8) and open valve (7). Activate the means of producing vacuum until absolute pressure in cylinder (1) reaches 0.02 MPa as indicated by vacuum gauge (2).

A-1.4 Open valve (6). Check that absolute pressure as indicated by vacuum gauge (10) does not exceed 0.05 MPa for at least 5 s.

A-1.5 Close valve (6) and open valve (8). Examine the catchpot (4) for presence of any water.



KEY
1 MILD STEEL CYLINDER
2 VACUUM GAUGE MEASURE 0 - 0.1 MPa
3 SUPPORTING ARRANGEMENT FOR CISTERN
4 CATCHPOT
5 CISTERN
6 FULL - WAY VALVE
7 SHUT - OFF VALVE
8 DRAIN VALVE
9 VALVE UNDER TEST
10 VACCUM GAUGE MEASURE 0 - 0.1 MPa

FIG. 4 DIAGRAMATIC REPRESENTATION OF ANTISIPHONAGE TEST APPARATUS

ANNEX B

(*Clause* 8.3.1)

FLOW TEST

B-1 Fit the float valve in a cistern B conforming to IS 7231 (*see* Fig. 5). Connect container A to cistern B with a tube having 15 mm bore.

B-2 Cause the float valve to discharge water from container A into cistern B for a period of 180 s while maintaining the water level in container A at a height of (1.5±0.1) m above the centre of inlet of valve for the duration of the test.

B-3 At the end of 180 s, measure the volume of water in cistern B.

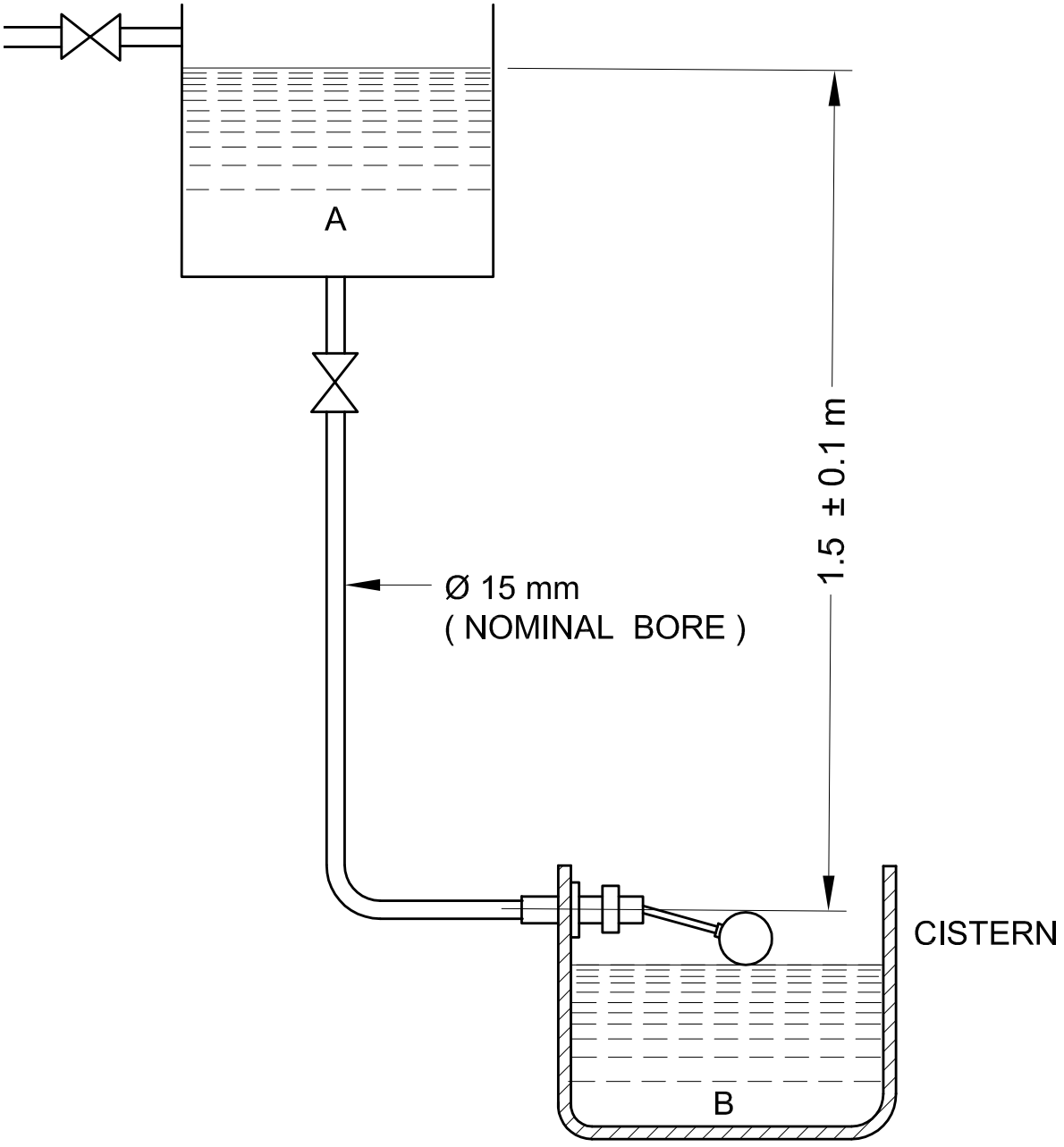


FIG. 5 SCHEMATIC DIAGRAM OF FLOW TEST

ANNEX C

(*Clause* 8.4.1)

ENDURANCE TEST

C-1 APPARATUS

C-1.1 Test equipment shall be capable of so operating the float arm as to fully open and fully close the valve on an automatic cycle (*see* **C-2.1**).

C-1.2 Water supply arrangement shall be capable of supplying water at a head of (1.5 ± 0.1) m.

C-2 PROCEDURE

C-2.1 Install the float valve on test equipment and start the operating mechanism. The operations constituting one cycle of at least 6 s duration shall comprise:

a) Fully open the valve in not less than 1 s,
b) Allow the valve to remain in the open position for 2 s,
c) Fully close the valve in not less than 1 s, and
d) Allow the valve to remain closed for 2 s.

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Sanitary Appliances and Water Fittings Sectional Committee, CED 03

Organization	*Representative(s)*
Municipal Corporation of Greater Mumbai, Mumbai	Hydraulic Engineer (Shri A. S. Rathore) (***Chairman***)
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Panel for Formulation of Standards for Requirements for Water Efficient Plumbing Products, CED 03 : P1

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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